

ADDITIONS TO THE LIST OF HEMIPTERA OF IOWA,
WITH DESCRIPTIONS OF NEW SPECIES.

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A number of additions to the Hemipterous fauna of the state have been made during the last year, either by collection or by the determination or description of specimens previously in hand, and although there are certainly many others to add it seems desirable to record such as have come to notice. In many cases the record greatly extends the range of the species as heretofore known.

HETEROPTERA.

FAMILY SCUTELLERIDÆ.

Homæmus ceneifrons Say. Rare, three specimens, Ames.

Homæmus bijugis Uhler. Ames, Little Rock.

FAMILY CYDNIDÆ.

Geotomus sp.

FAMILY PENTATOMIDÆ.

Perillus circumcinctus Stal. One specimen, Sioux City, July 7, 1897.

Mecidea longula Stal. One specimen, Sioux City, July 5, 1897.

Trichopepla atricornis Stal. Little Rock and Ames.

Peribalus piceus Dallas. Two specimens, Little Rock. Collected by E. D. Ball.

Holocostethus abbreviatus Uhl. One specimen, Ames. Easily confused with *Peribalus limbolaris*.

Banasa dimidiata Say. Ames, not common.

FAMILY COREIDÆ.

Chariesterus antennator Fab. One specimen, Sioux City, July 5, 1897.

- Catorhintha mendica* Stal. Ames.
Harmostes reflexulus Say. Ames and Sioux City.
Aufeius impressicollis Stal. Ames.
Corizus lateralis Say. Ames.
Daycoris humilis Uhl. Little Rock. Collected by Mr. Ball.

FAMILY LYGÆIDÆ.

- Pamera vicina* Dallas. Ames, Little Rock.
Rhypparochromus floralis Uhl. Ames.
Scolopostethus affinis Uhl.

FAMILY CAPSIDÆ.

- Teratocoris discolor* Uhl. Ames and Little Rock. Rare.
Pallacocoris suavis Reut. Sioux City.
Lopidea strigta Uhl. Ames.
Lopidea fuscicornis Uhl. Little Rock.
Lopidea nigrida Uhl. Ames.
Lomatopleura cesar Reut. Ames, Little Rock, Sioux City,
 Cherokee.
Hadronema pulverulenta Uhl. Ames.
Phytocoris eximius Reut.
Phytocoris puella Reut.
Phytocoris puella var.
Phytocoris sp.
Melinna fasciata Uhl. Ames. Common in 1897.
Melinna modesta Uhl. Common at Ames, 1896 and 1897.
Largidea opaca Uhl. var.
Fulvius anthocoroides Stal. One specimen, Ames, August 6,
 1897.
Mimoceps gracilis Uhl. Ames and Little Rock.
Sthenarops malinus Uhl. Ames. Common.
Macrotophus separatus Uhl. Ames.
Episcopus ornatus Reut. Ames and Des Moines.
Plagiognathus obscurus Uhl. Ames.
Coquillettia mimetica n sp. Ames.
Sericophanes ocellatus Reut. Dimorphic female, ant like.

FAMILY TINGITIDÆ.

- Leptostyla oblonga* Say. Ames. Common,

FAMILY ARADIDÆ.

- Neuroctenus simplex* Uhl. Ames. October 11, 1897. On grass
 far from timber.

FAMILY NABIDÆ.

Coriscus annulatus Reut. Ames.

SALDIDÆ.

Salda deplanta Uhl. Ames. Plentiful during 1897.

Salda ligata Say. Le Claire. (J. A. Rolfs.)

HOMOPTERA.

FAMILY BYTHOSCOPIDÆ.

Macropsis apicalis O. & B. Ames.

Pediopsis trimaculata Fh. Ames.

Pediopsis basalis V. D. Ames.

Pediopsis bifasciata V. D. Ames.

Pediopsis ferruginoides V. D. Ames.

Pediopsis suturalis O. & B. Ames.

Pediopsis erythrocephalus G. & B. Ames.

Pediopsis gleditschiæ O. & B. Ames. Very common on honey locust.

Pediopsis reversalis O. & B. Ames. Very common on willow

Agallia uhleri V. D. Sioux City, July 7, 1897.

Agallia cinerea O. & B. Sioux City and Little Rock in July.

Idiocerus pallidus Fh. Ames.

Idiocerus duzeii Prov. Ames.

Idiocerus brunneus O. & B. Ames.

Idiocerus snowi G. & B. Ames.

Idiocerus moniliferæ O. & B. Ames.

FAMILY TETTIGONIDÆ.

Gypona pectoralis Spang. Ames. Rather common.

Gypona cinerea Uhl. One specimen collected at Little Rock,

FAMILY JASSIDÆ.

Dorycephalus vanduzeei O. & B. At Little Rock. Collected by E. D. Ball.

Parabolacratis flavidus Sign. (?). One specimen, Audubon (Ball).

Paramesus stramineus n. sp. Ames, Sioux City, and Little Rock.

Deltocephalus imputans O. & B. Ames.

Deltocephalus obtectus O. & B. Ames.

Deltocephalus cruciatus O. & B. Ames.

Deltocephalus collinus Dahlb. Little Rock and Sioux City. July.

Scaphoideus ochraceus n. sp.* Ames.

Scaphoideus picturatus n. sp. Burlington.

Lonatura catalina O. & B.† Ames, Sioux City, Burlington.

Lonatura megalopa O & B. Little Rock.

Driotura robusta O. & B. Sioux City, July 7, and Little Rock.

Athysanus anthracinus V. D. Ames.

Athysanus parallelus V. D. Ames.

Athysanus osborni V. D. Ames.

Athysanus punctatus O. & B. Ames and Little Rock.

Eutettix scaber O. & B. Ames.

Eutettix cincta‡ O. & B. Ames.

Eutettix modesta O. & B. Ames.

Phlepsius lobatus n. sp. Ames and Little Rock.

Thamnotettix cyperaceus n. sp. Ames.

Thamnotettix ciliata n. sp. Ames.

Thamnotettix pallidula n. sp. Ames.

Chlorotettix balli n. sp. Ames.

Alebra albostriella Fall. Ames.

Typhlocyba comes var. *ziczac* Walsh. Ames.

Typhlocyba querci Fh. Ames.

Typhlocyba rubrasvula var. *bifasciata* O. & B. Ames. Berwick (Mally).

Typhlocyba lethierry Edw.

Typhlocyba rosæ var. *commisuralis* Stal. Ames.

FAMILY CERCOPIDÆ.

Philenus bilineatus Say. Little Rock (Ball).

FAMILY FULGORIDÆ.

Kelisia axialis V. D. Ames.

Kelisia crocea V. D. Ames.

Liburnia osborni V. D. Ames and Fairfax.

Liburnia puella Van D. Ames.

Pentagramma vittatifrons. Uhl. Ames. Rare.

Laccocera vittatipennis Van D. Little Rock.

Pissonotus aphidioides Van D. Ames.

Pissonotus brunneus Van D. Ames.

Pissonotus marginatus Van D. Ames.

Pissonotus ater Van D. Ames.

Myndus impunctatus Fitch. Ames

Peltonotus histrionicus Uhl. Little Rock.

*Description of new species included in the list are appended at end of list.

†Listed in the additions of previous papers as *Doratura minuta* on mistaken identification.

‡Heretofore listed as *Eutettix jucundus* Uhl.

FAMILY MEMBRACIDÆ.

Vanduzea vestita Godg Ames, Little Rock, Sioux City, on *Petalostemon*.

Ophiderma flaviguttata Godg. Ames.

Heliria strombergi Godg. Ames.

Telamona pyramidata Uhl.

COQUILLETIA MIMETICA N. SP.

Ferruginous or ferruginous brown to fuscous. Females apterous, and simulating an ant. Male with very long wings and slender abdomen, ostea

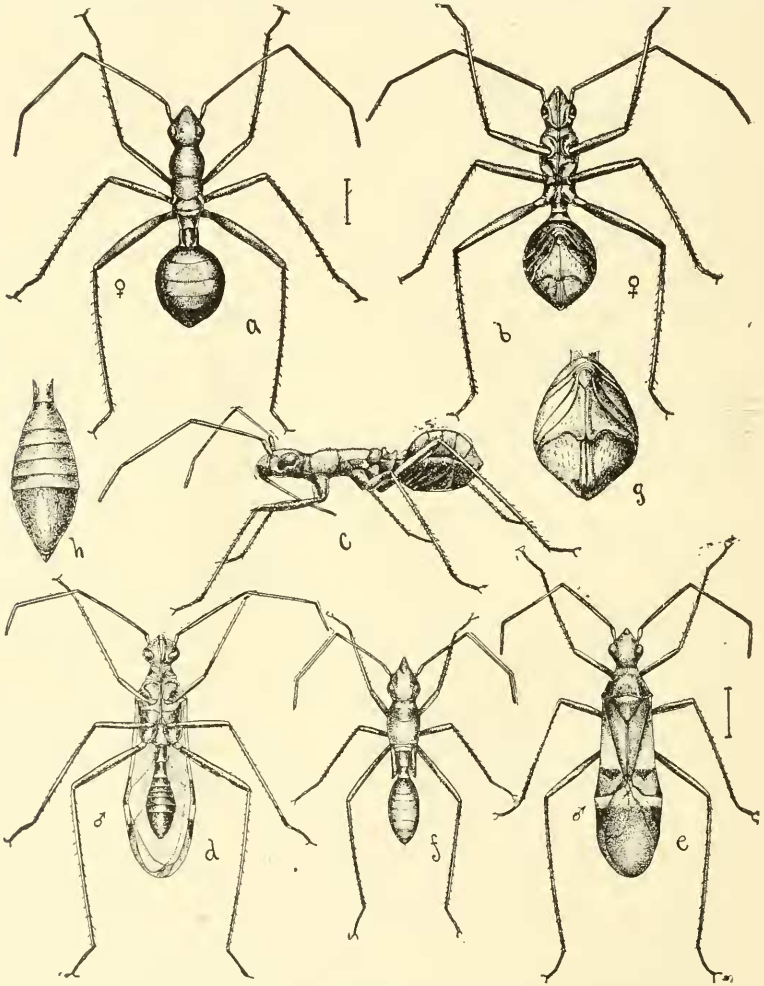


Fig. 15.

Coquilletia mimetica. a, female dorsal view. b, female ventral view. c, female lateral view. d, male ventral view. e, male dorsal view. f, larva. g, female abdomen enlarged. h, male abdomen enlarged (From drawings by Miss King.)

curved, inflated, extended posteriorly, margin second abdominal segment white.

Length: female, 5.5 mm., male, 4.5 mm.; to tip of elytra, 6.5.

Apterous female. Head wider than pronotum, convexly narrowing to the pointed tylus, eyes moderately prominent, their outline conforming to the margins of the head; antennæ long, nearly equaling the length of body, first joint short, not passing the tylus; second joint longer than third and slightly thicker; fourth joint half as long as second, more slender than third, slightly curved; rostrum exceeding middle coxæ, first joint extending to border of buccula—remaining joints subequal, pronotum somewhat tumid, narrowed to form a collar in front, mesosternum slightly convex with marginal carinæ and slightly produced on metanotum; metanotum short, elevated laterally, carinate. Legs long, slender, coxæ strong. Abdomen with first two segments constricted to form a pedicel, the first one strongly elevated in a broad process in front and with an elevated posterior margin and the pleura forming a sharp lateral elevated carina or lamina, the second slightly wider behind, the lateral carinæ less prominent, remaining segments forming a globose, polished, minutely, sparsely haired body with conspicuous pleural fold, and elongate carinate sheath for the ovipositor. The ovipositor originates close to base of the globular portion of abdomen, the sternal parts of segments being extremely narrow and the sheath formed from the sixth, seventh, and eighth sternites.

Color brown, with the eyes, rostrum, apex of second joint and all of joints three and four of the antennæ, apex of tibiæ and the tarsi, fuscous or blackish. The globose portion of abdomen and dorsum of second segment are dark chestnut or piceous. The border of the ostea, a narrow posterior margin on first abdominal segment, the posterior border of second abdominal segment except the dorsum, light yellow or white.

Male. Head smaller, slightly more globose and eyes more prominent than in female. Pronotum widened at base, the sides nearly straight, the basal portion elevated and the posterior margin slightly concave. Scutellum large, swollen in front with a transverse area and an impressed line on the disc, the posterior portion carinate. Elytra broad, long, with a semi-transparent area at the basal half of the corium and another occupying basal part of cuneus; mesoternum large, polished, ostea large and curved internally, enlarged laterally and prominent. Legs slender. Abdomen very slender, pedicellate, polished, minutely pubescent, scarcely one-third width of elytra and extending about two thirds their length, the terminal ventral segment narrowing posteriorly, strongly curved upward, dorsally tubular, the claspers simple.

Color: Head, basal part of antennæ, anterior lobe of pronotum, scutellum, clavus, posterior half of corium, pectus, femora and part of tibia, and basal portion of abdomen testaceous or testaceo-ferruginous and polished except the rather ferruginous parts of elytra. Joints 2, 3, 4 of antennæ, apical portion of tibia, tarsi, cuneus except the base, and membrane of elytra blackish, apical portion of venter piceous. The basal transparent portion of elytra and a broad oblique band forming base of cuneus, the border and inflated exterior portion of ostea and posterior margin of second abdominal segment, white.

The larvæ are similar to the adults in color and form, but have the peculiar structure of the abdomen less marked.

This insect is of special interest inasmuch as we have as yet no winged form of female and only the winged form of the adult male. The apterous female form is remarkably ant-like in shape and appearance, as are in less degree the larvæ. They were at first supposed to be larvæ, but it was noticed that all the winged forms were adult males and an examination of all the wingless forms with the globose abdomen proved them to be mature females.

They have been found only on elevated grassy ridges and probably feed on some of the grasses, such as *Bouteloa*, which are common to prairie and plain.

An ant of an undetermined species and extremely like the female in appearance has been taken from the same locality.

In the figures the head is represented as raised on a level with the prothorax; but in pinned specimens and probably in the living individuals when not moving the head is bent downward and the prothorax curved on mesothorax, giving still more of an ant-like appearance.

Professor Uhler established the genus *Coquilletia* to include *insignis*, of which he remarks that only males have been seen. There can be little doubt that its female is also apterous, and on this account has escaped collection.

While possible that winged females may occur, it is evident that the apterous condition is the usual one.

SERICOPHANES OCELLATUS REUT.

This handsome little Capsid presents an interesting case of dimorphism and also of mimicry, the brachypterous female closely resembling an ant in the large pedicellate globular abdomen.

Only the winged form, and presumably only the male, has hitherto been described, and that very briefly.

Brachypterous form.—Female: Ant-like the elytra reduced to rudiments reaching only to end of second abdominal segment. Abdomen from third segment globular. Head, thorax and abdomen polished. Length, 2.50 mm.

Head large, the space between the eyes equaling the pronotum in width; eyes large; antennæ moderately long, not longer than length of body; first joint thick, not reaching the end of tylus; second joint larger than third; fourth rather shorter than third; prothorax sub-globular, highly polished; scutellum broad, triangular; elytra reaching to or slightly upon the

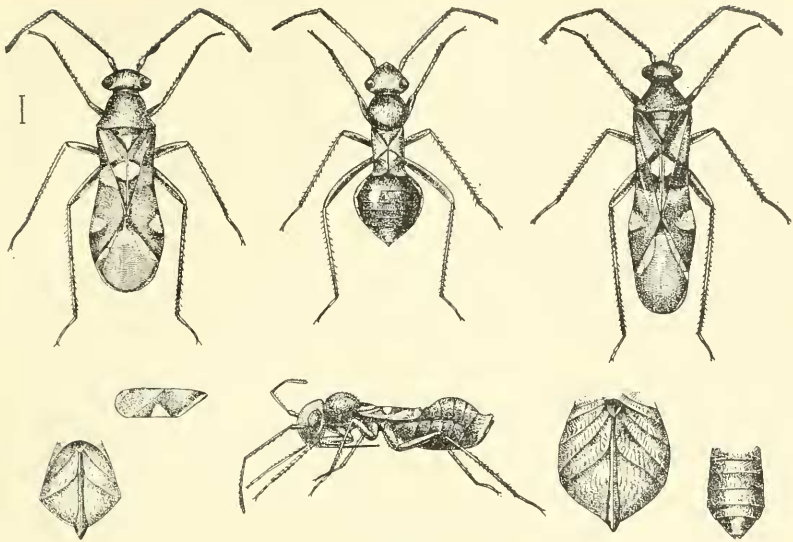


Fig. 16.

Sericophanes ocellatus. Dorsal views macropterous female at left, micropterous female in middle. Male at right. Below, ventral views of female abdomen macropterous at left, micropterous at right. Male extreme right.

globular portion of abdomen; wings wanting or very rudimentary; abdomen at base slender; joints three to eight forming a sub-globular, slightly flattened broad portion; a prominent pleural fold extending from the base to end of seventh segment.

Color: Head, thorax, elytra, base of abdomen, the second joint of antennæ, femora, tibiæ and base of tarsi reddish brown: first joint of antennæ yellow: a bright yellow spot on elytra as in macropterous forms, apex of second joint and all of third and fourth, and tips of tarsi fuscous. Abdominal 4-7 segments black or pitchy brown entirely, beneath in two triangles, the apices of which nearly meet in the median line.

No brachypterous male has been observed.

Macropterous form.—Female: Similar to brachypterous form but with fully developed elytra and wings, a much less extended abdomen, and the pronotum widened at base with prominent angles. Length, 2.50. to tip of elytra, 3 mm.

Head smaller and with front less convex than in brachypterous form; antennæ similar; prothorax much less tumid, narrower in front and widening posteriorly to form prominent humeral angles, and with the posterior margin overlapping scutellum and base of elytra; scutellum similar or a trifle larger; elytra broader and shorter than in males; the tip of corium not projecting as an obtuse angle; wings reaching to tip of elytra; abdomen slender at base, expanding to end of seventh segment, where they are almost as wide as the folded elytra, then contracting sharply to tip, flattened, the tip of ovipositor projecting.

Color the same as in the other forms, but in the specimens in hand the lower part of head and under surface of abdomen is somewhat suffused with rufous. The three powdery white bands on the elytra and the bright yellow across the clavus just back of the scutellum are very distinct. A spot each side of the central yellow ocellus and the cuneus are more golden brown than the rest of the elytra. The membrane is fuliginous except a transverse band at base and a narrow margin to the cuneus which are whitish transparent.

Male: More slender, darker, head smaller and eyes more prominent. Length 2 mm.; to tip of elytra 3.10 mm.

Head nearly vertical, eyes prominent, prothorax strongly declivous, widening to humeral angle; scutellum triangular, similar to female. Elytra long, narrower than in female and with the end of corium and base of cuneus forming an obtuse angle. Abdomen slender, flattened, the sides nearly parallel.

Color, dark brown or chestnut, the lower part of head a little lighter or tinged with rufous; the first and second joint of antennæ are yellowish and the spot on dorsum back of scutellum is light yellow: the elytra are chocolate brown with band inclosing the ocellate spot and the cuneus golden brown; three broken whitish or pruinose bands across the elytra, the point of scutellum and ocellate spot not quite reaching costal margin and the third at base of cuneus represented by a triangular patch next the costa; membrane as in the female; mesosternum piceous, polished, abdomen fuscous or blackish, yellowish-brown at base, polished.

Larvæ taken with adults present similar characters, but are quite remarkable in the greatly inflated terminal joint of the antennæ. The bodies are too much shriveled to permit of description.

The macropterous females were collected May 28th and June 7th, the brachypterous females May 22d, June 3d-7th and 12th, and July 31st, the males June 2d-7th and July 28-29th. Larvæ July 28th. This indicates a rapid development of the larvæ between the 1st of June and the latter part of July and probably two broods for the year, but no rearing of the larvæ or exact limitation of the broods has been attempted. They occur on grassy ridges in same location as preceding species.

The significance to be attached to the peculiar dimorphism and mimicry presented in this and the preceding species opens a question of too far reaching importance to be discussed here. That they resemble ants is certain, that they may by this resemblance gain some advantage is possible, but whether the abortion of the wings and elytra is merely the result of such mimicry or connected with advantages of an entirely different nature we are not prepared to guess. I have used the term mimicry in a general way to cover this feature of resemblance but I would dissent from the use of this term in such a loose manner if a better one were available. Such resemblances

seem to me not of necessity mimicry in its proper sense, or protective resemblance but merely the assumption of a similar form by different animals when adapting themselves to similar environments. The question readily broadens into a discussion of all the factors of adaptive evolution and while attractive is too large to attack in such a paper as this:

PARAMESUS STRAMINEUS N. SP.

Very similar to *P. twiningi* but of a light greenish-yellow color, the dark band of elytra absent and the lower half of face light yellow. Length to tip of elytra, female 5.50 mm., male 4.50 mm.

Vertex rounded at apex, one-half longer at middle than next eye, anterior two-fifths rising to form a distinct, elevated, angular margin. Front sinuate next antennæ then narrowing uniformly to base of clypeus; clypeus twice as long as wide, widening to apex; genæ sinuated below eye, scarcely angular laterally, reaching clypeus by a narrow line; loræ elongate, angular at ends, twice as long as wide, their lower ends not reaching clypeus by a considerable space. Pronotum minutely transversely rugulose on posterior two-thirds, evenly arcuate in front, scarcely concave behind and with a very shallow emargination near the middle, lateral margin short, with a distinct carina, humeral margin distinct, rather short, angles subprominent. Elytra with a few ramose nervures in clavus and between second sector and claval suture.

Color: Vertex, anterior two-fifths ivory white with two large, black, angular transverse spots near middle and a smaller, irregular, lineate fuscous one each side near eyes; the posterior two thirds uniformly greenish-yellow or pallid with a longitudinal black impressed line at center. Face dark in upper half and light in lower; a conspicuous black line from eye to eye just below margin of vertex; front fuscous with light lines; clypeus light fuscous; genæ and loræ yellow, sutures black; pronotum greenish on disk and posteriorly with bluish tint; front, margin, and sides more yellowish, faintly mottled with irregular whitish maculations; scutellum ochre yellow with whitish triangle on lateral margins and at tip, and a faint fuscous line separating the usual areas; elytra hyaline or pellucid with the few ramose lines, a spot in the second, third and fourth apical, the middle and inner anteapical cells, and an apical submargin, fuscous; apex of clavus and costal transverse nervures dark fuscous or black; beneath light yellow spotted and lined with black; tergum black with yellow maculate margin.

Genitalia: Female, ultimate ventral segment long, posterior margin broadly, shallowly excavated and bearing at center a ligulate process about as long as wide and minutely notched at tip, pygofers posteriorly set with minute remote short gray hairs arising from black points; male, valve very short, scarcely visible; plates elongate triangular, reaching to tips of pygofers, margins with a few hairs.

Described from five females and one male. Of the females two were collected at Sioux City, July 7th, one at Sioux Falls, S. D., July 4th, and one at Ames, June 15th; and one collected

at West Point, Neb. in June has been sent to me by Professor Bruner. The male was collected by Mr. Ball at Little Rock, Iowa, July 2d.

While this form is strikingly like *twiningi* in general characters the very marked difference in color, the absence of black bands on the elytra, and the differently colored face cannot fail to distinguish it, and until intermediate forms are found or it can be proven by life-history details that they intermingle it must stand as distinct. It evidently belongs to the plains fauna and probably feeds upon some of the Compositæ.

SCAPHOIDEUS OCHRACEUS N. SP.

In size and color resembling *juvundus* but in venation like *intricatus* or *luteolus*. Tawny ochraceous and pallid with most of the elytral nervures fuscous. Length to tip of elytra, female 6 mm., male 5 mm

Vertex as long as width between the eyes, nearly as long as pronotum, the margin angularly rounded; front, narrow; margins slightly concave next the antennæ, tapering uniformly to base of clypeus, which it equals in width. Clypeus twice as long as width at base, broadening to the apex, which is distinctly truncate: loræ oval, sub-angulate at tips, twice as long as wide; genæ broad, slightly concave below eyes and sub-angulate on margin forming a narrow margin below loræ.

Elytra with the first two reflexed costal veinlets very oblique, as in *immistus*, the first originating at or just in front of the transverse veinlet; the second near the middle of the outer anteapical cell; the third at the end of the anteapical cell but not touching the apical veinlet. In one specimen an extra oblique vein occurs between first and second.

Color: Vertex yellow with a broad ochraceous or ochraceous-rufus band across the disk, the median portion forming a short curve and reaching the width of the band toward the apex, sometimes almost interrupted; the anterior border with a fuscous line broader, fainter, and broken at the apex; front yellow with two black or fuscous lines running nearly from eye to eye, and three or four short broken arcs becoming obsolete toward the middle; a small fuscous spot on genæ below the insertion of the antennæ; pronotum with two large spots on the anterior margin near the middle; the posterior half, except narrow median line, two large lateral spots and a slightly fainter median stripe, a wide border to nearly all the nervures and the apex of elytra, ochraceous; a spot at end of inner claval nerve a short line at end of outer claval nerve, an elongate spot at end of clavus, a spot in inner discal area, interrupted lines on the nervures most conspicuous on the reflexed veinlets and next the costa and a sub-apical border, fuscous; the elytral cells whitish hyaline; below light yellow and pallid; the posterior border ultimate ventral segment female, terminal bristles on pygofers; a series of points and terminal annulus on tibia, tip of first joint and all of second joint of tarsus, deep fuscous or black.

Genitalia: Female, ultimate ventral segment long, the posterior border straight or very slightly produced at the middle. Pygofers full, polished,

with marginal and terminal bristles, the latter strong; male, valve very short, transverse: plates broad, roundly narrowing to obtuse tip with weak marginal bristles; pygofers rather broad, extending half their length beyond the plates and set with long, stiff bristles.

Described from twelve females and seven males collected at Ames from July 29th to August 13th.

While this species has the general color of *jucundus* it differs from that species very distinctly in the oblique reflexed veinlets and in having the transverse band on the vertex instead of the two parallel spots. From *immistus*, *intricatus* and *luteolus*, which it resembles in venation, it differs in color and size.

SCAPHOIDEUS PICTURATUS N. SP.

Color pattern very similar to *sanctus*. Head more sharply angular, reflexed veins less oblique or indistinct. Length to tips of elytra, female 5 mm., male 4 mm.

Vertex sharply angulate at the tip, as long as width between eyes, and nearly twice as long at middle as next eye. Front very slightly widening next antennæ, tapering uniformly to base of clypeus; clypeus with sides parallel, base and apex convex; loræ small, suboval; genæ roundly angulate below the eyes. Pronotum sharply arcuate in front, truncate behind, lateral margin extremely short; scutellum small, the elytra with the post-nodal veinlets irregular, the first either absent or not reflexed, the second strongly reflexed, the middle and inner antepical cells with distinct or obsolete cross nervures.

Color: Vertex, anterior part of pronotum, scutellum, face, pectus, venter and margin of abdomen above, yellow or greenish-yellow; two minute points next each eye, two short oblique lines near tip, and a very slender median line on vertex, three or four strongly curved arcs on the front, the margins of the olivaceous areas, an oblique band near the tip, and a submarginal border on the elytra, fuscous. The elytra are fusco-olivaceous, interrupted with ivory white as follows; a broad oblique band on the base of corium and clavus paralleling the sides of the scutellum, a discal spot at forking of the first sector, a commissural spot and a broad band across the base of the antepical cells. The nervures are white on the white portions and also in the fuscous part at apex.

Genitalia: Female, ultimate ventral segment short, slightly notched on the median line; pygofers thickly set towards tip with rather fine bristles: male, valve small, plates long, tapering gradually to the obtuse tip, exceeding the short pygofers. Both plates and pygofers are finely ciliate with pale hairs.

Described from one female received from Prof. H. Garman, Lexington, Ky., and one male which I collected at Burlington, September 5, 1897.

While this appears superficially to resemble *sanctus*, the different venation and the different markings on the vertex as

well as the very different genitalia renders it easily separated from that species. In venation it approaches *Deltocephalus* and adds another link to the chain connecting the two genera.

THAMNOTETTIX CILIATA N. SP.

Green or yellowish-green, the under part of thorax and nearly all of abdomen black. Head with four quadrate black spots on margin between eyes and two on the vertex behind the outer ones. Length to tip of elytra, female 5.50 mm., male 5 mm.

Vertex subangulate in front, about one-half longer in middle than next eye. Front tapering evenly to the broad apex, apical angles rounded; clypeus widening but slightly to the truncate tip, nearly twice as long as wide; loræ large, nearly reaching tip of clypeus, genæ broad, sides rounding reaching the clypeus by a narrow line. Pronotum one-third longer than vertex, slightly emarginate posteriorly, humeral margins long, lateral margins short, rounded; elytra long, narrowed, the nervures distinct, becoming fainter near costa towards apex.

Color: Head yellow with a conspicuous transverse row of four quadrate black spots on margin of vertex extending down on to the front, two small approximate spots or lines on the disk about half way from occiput to tip, variable in size and a spot on each side near the eye parallel to the outer marginal spot, in some cases reduced to a round dot. A spot at base of antennæ, four or five interrupted arcs on front, and frontal sutures, black; sometimes spots of black on genæ and loræ and an annulus on second joint of antennæ, in female, black. Pronotum, greenish transparent, with anterior border more yellow; scutellum yellow; elytra greenish hyaline or flavescent, the nervures yellowish or whitish and in the females usually bordered with fuscous. Tergum black except margin and part of terminal segment yellow; pectus and venter black, lateral margins, posterior margins of base and side margins of ultimate ventral segment, a narrow posterior border to the segments and the pygofer of female, and usually plates and pygofer of male, yellow or whitish.

Genitalia: Female, ultimate ventral segment slightly longer than penultimate, minutely rugulose; posterior margin scarcely concave; pygofer large, slightly exceeded by the ovipositor and set with stiff grayish bristles, those at apex stronger and darker; male, valve long, nearly as long as wide, posterior border convex; plates short, divaricate, obtuse or truncate, and bearing a few stiff hairs on disk and a dense brush of long white ciliate hairs from the margin; pygofer long, exceeding plates, obliquely truncate obtuse at tip, their margins set with a series of stiff hairs.

Described from numerous examples of both sexes collected in Iowa and one female from Colorado (Gillette). Adults at Ames from June 2d to July 2d, and from August 27th to October 9th. Three specimens from Little Rock July 2d (Ball), and two from Algona, Iowa, May 9th (Mally).

This species presents many striking resemblances to *smithi*; in fact, specimens of *smithi* having the frontal black band inter-

rupted are scarcely distinguishable except by form of clypeus. Usually, however, *smithi* has a broad, unbroken band, without any traces of spots on the vertex, but with the border of loræ next clypeus with a broad black line, exaggerating the width of clypeus, while *ciliata* seldom or never has the quadrate spots of the frontal band coalesced, and the loræ, while sometimes slightly spotted with black, lack the line next the clypeus.

The greater length and narrower tip of the clypeus, and the broader, more truncate, male plates are the decisive structural characters.

THAMNOTETTIX CYPERACEUS N. SP.

Resembles *melanogaster* but larger and usually more deeply colored, and with three parallel croceus stripes on head and pronotum. Length to tip of elytra, female, 6 mm.: male, 5.25 mm.

Vertex nearly twice as wide on the middle as next the eye, angulate at tip, the margin sharply angular, front narrowing evenly to clypeus, scarcely emarginate next antennæ; clypeus slightly widened and more nearly truncate at the apex; genæ evenly rounded. Pronotum long, about one-half longer than vertex, slightly concave behind, lateral and humeral angles rounded. Elytra long, the nervures distinct, claval nervures parallel.

Color: A broad stripe and a narrower median one on the head; pronotum and scutellum tawny, alternating with yellow. Ocelli red. Four transversely linear spots just below the margin of the vertex (not, or scarcely visible, from above) the insertion of antennæ and the lateral margins of front, dorsum of abdomen except margin and terminal segment, disk of venter and ovipositor black. Elytra tawny hyaline with whitish nervures. Margin of abdominal segments yellow or tinged with rufous posteriorly.

Genitalia: Female, ultimate ventral segment scarcely longer than penultimate, very slightly emarginate on either side of the middle of posterior border. Male, valve produced, large, and rounded posteriorly, with a median impressed line at the tip; plates short, obtuse, and thick at the apex, with dense tufts of hairs and a conspicuous bristle arising from extreme tip; pygofers short, hairy.

Described from four males and four females collected from *Carex* at Ames, Iowa, October 6, 1897. In the disposition of black markings this species almost duplicates *melanogaster*, but it is much larger, the male genitalia are quite different, and other characters will easily separate them.

THAMNOTETTIX PALLIDULA N. SP.

Smaller and lighter colored than *melanogaster* and with the under surface pallid. Approaches *fitchi* but markings are less distinct. Six points in a line across the front part of vertex, either all black or part or all of them faint or obsolete. Length to tip of elytra, 4 mm.

Vertex one-third longer on middle than next eye, very obtusely and roundly angulate, the margin rounded; front narrowing rapidly from antennæ to clypeus; clypeus nearly twice as long as broad, scarcely widening at apex; loræ small, oval; genæ broad, distinctly angular. Pronotum strongly curved anteriorly, posterior border straight, lateral margins very short. Elytra long and narrow, nervures distinct.

Color: Vertex, pronotum and scutellum light yellow with faint ochraceous stripes, the two median ones extending to margin of vertex and diverging posteriorly to cover the lateral angles of the scutellum, the outer ones on pronotum only. Across the front of the vertex a row of six dots, the inner ones behind the margin the outer ones directly on the margin in front of the eyes, all black or the inner ones faint or obsolete, but those next the eyes are black in all but one of the specimens in hand. The elytra are flavescent or faintly cuprescent with the nervures conspicuously whitish. Beneath, entirely pallid, except the median posterior part of the ultimate ventral segment in female, bordering the notch laterally, and exposed edges of ovipositor, light fuscous. Venter and margins of dorsum in male sometimes more decidedly yellow.

Genitalia: Female, ultimate ventral segment short, the posterior margin produced each side of a median broad and deep notch, the median portion of which is straight or scarcely produced into a very obtuse tooth pygofers set with stiff hairs on the posterior portion; male, valve, anterior margin convex, posterior margin straight; plates triangular, outer margin slightly convex and sparsely ciliated; points acute; pygofers exceeding the plates, obliquely sinuate, acute at tip and bearing rather strong hairs.

Described from eight females and four males collected at Ames, Iowa, by Mr. E. D. Ball.

This species is quite similar to *fitchi* in size but is more yellow in color and the genitalia are quite distinct.

CHLOROTETTIX BALLI N. SP.

Resembling *unicolor* and *spatulatus* but more yellowish-green and with the vertex subangulate. Ultimate ventral segment female with a spatulate process.

Length to tip of elytra. female, 7-7.25 mm., male, 7 mm.

Vertex one-half longer on the middle than next the eyes, subangulate; front narrowing in almost straight lines to the clypeus; clypeus broader and shorter than in *spatulatus*, base and tip slightly convex, sides parallel. Pronotum strongly emarginate behind. Elytra entirely hyaline, the veins indistinct.

Color yellowish-green. Head and thorax usually darker green, the tip of vertex, margin of venter, and dorsum of abdomen in most specimens suffused with ochreous.

Genitalia: Female, ultimate ventral segment long and with a deep notch extending to near the base and including a spatulate process as in *spatulatus*. The notch is deeper and wider and more open at the base of the spatulate process, the process is broader and reaches only half way to the tips of the sub acute lateral margins of the segment; male, valve large,

longer than in *spatulatus*; plates narrowing rapidly behind the middle, the tips upturned, divaricate and scarcely acute; a row of bristles along the outer margin, few in numbers, set in a uniform series and a few minute cilia at the extreme tips; pygofers long, exceeding plates, pointed at tip.

Described from eleven females and four males, collected at Ames, Iowa, July 4th-11th-29th, and August 3, 1896.

Except for the more yellow color and the different shape of the vertex this species resembles very closely the *spatulatus*, but there is a distinct difference in the genitalia, notwithstanding the presence of the spatulate process which is so far known only in these two species. Two males which are otherwise apparently identical with the above have the plates passing the pygofers much more acutely pointed, and the elytra distinctly infuscated at tip. It seems hardly possible that they can belong with this species, but no females agreeing with them have been seen. Dedicated to Mr. E. D. Ball.

PHLEPSIUS LOBATUS N. SP.

Color and shape of *truncatus* but slightly smaller. The female ultimate ventral segment produced at sides into a distinct obtuse lobe. Length to tip of elytra, female, 5.75 mm.; male, 5.50 mm

Head as wide as pronotum; vertex about one-third longer on middle than next eye (slightly fuller in male than in female). Front almost as wide between the eyes as length, narrowing rapidly to the apex, the margins from antennæ to apex straight. Clypeus narrowed at the base, truncate at apex; loræ large, the frontal angles sharp; genæ rounding regularly from the situation below the eye. Pronotum with the posterior portion distinctly concave; scutellum broad, with a sharply impressed line on the disk.

Color: Above, gray from the finely irrorate and lineated white and fuscous markings. Front dark fuscous in upper part, becoming lighter below; pectus, venter and legs whitish with fuscous maculations and points.

Genitalia: Female, ultimate ventral segment very long, depressed laterally and produced into marginal lobes, between which the posterior border is convex, the central portion elevated, becoming carinate and minutely notched at posterior border. Male, valve triangular, plates rather narrow, tapering uniformly from base to sub-acute apex.

Described from one male and one female collected at Little Rock, Iowa, July 2, 1897, by Mr. E. D. Ball, and one female at Ames, Iowa, September, 18th.

This might easily be mistaken for *truncatus*, or even for a small *irroratus*, but the genitalia are strikingly different.